REQUEST FOR WITHDRAWAL OF FINALITY OF OFFICE ACTION

Applicants request withdrawal of the finality of the Office Action, since claim 9 was rejected on new grounds, not necessitated by any amendment thereof.

More particularly, in the previous Office Action mailed July 8, 2002, claim 9 was rejected for obviousness under 35 USC §103(a) over Nagai (U.S. Patent No. 6,011,355) in view of Makino (U.S. Patent No. 6,160,530). Claim 9 was not amended in the intervening Amendment filed October 8, 2002 in response to that previous Office Action.

In this Office Action, claim 9 is rejected under 35 USC §103(a) over Marcotte (U.S. Patent No. 5,642,218) in view of Barclay et al. (U.S. Patent No. 4,594,588), both of which are newly-cited. Thus, this Office Action was made prematurely final.

ENTRY OF AMENDMENT AS A MATTER OF RIGHT

Applicants request entry of the instant Response because the finality of the Office Action was premature, since claim 9 is rejected on new grounds, not necessitated by any amendment thereof in the intervening Amendment. Further, the Rule 116 Response does not amend the claims and, otherwise, places the application in condition for allowance.

The Manual of Patent Examining Procedures sets forth in Section 714.12 that "any amendment that would place the case either in condition for allowance or in better form for appeal may be entered." Moreover, Section 714.13 sets forth that "the Proposed Amendment should be given sufficient consideration to determine whether the claims are in condition for allowance and/or whether the issues on appeal are simplified."

ALLOWABLE SUBJECT MATTER

In the Office Action at page 5, item 5, claims 3-4, 7, 10 and 13-15 are indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, these claims have not been rewritten in independent form since it is submitted that the respective independent claims, from which these allowable claims depend, patentably distinguish over the cited art and are allowable.

ITEMS 1 AND 2: REJECTION OF CLAIMS 1-2, 5-6, 8 AND 11-12 UNDER 35 USC §102(e) AS BEING ANTICIPATED BY KIM (U.S. PATENT NO. 6,211,867)

The rejection is respectfully traversed.

CLAIM 1-2, 5-6, 8, AND 11-12

The invention as recited in claim 1 relates to phase adjusting circuits (first and second phase adjusting circuits) that adjust timing of changing edges of driving signals which drive first and second output devices of X and Y sustaining circuits. Particularly, the changing edges of driving signals of the first and second output devices are adjusted. According to this feature, power consumption can be reduced and malfunctions or erroneous discharges can be avoided.

It is respectfully submitted that the Examiner's understanding of Kim is incorrect. Kim discloses a plasma display apparatus including a power recovery circuit.

The Examiner asserts, in the Office Action at page 3, lines 2-3, that Kim "teaches about a phase adjusting circuit that adjusts timing of a changing edge of a driving signal (col. 5, lines 15-53)." However, Kim discloses only adjustment of changing edges of driving signals of a power recovery circuit, and does not disclose or suggest first and second phase adjusting circuits that adjust timing of changing edges of driving signals of first and second output devices.

In the Kim plasma display apparatus, "[t]he DC high voltage outputted from DC voltage supplying section 190 is applied as sustentation voltage sus_V of the X and Y electrodes within an interval that sustentation voltage control pulse susH has a high level." (See Kim at column 6, line 67 to column 7, line 4.) The sustentation voltage control pulse susH controls (i.e., drives) an application of the sustentation voltage sus_V. (See Kim at column 5, lines 19-20.) Further, Fig. 3 of Kim shows a circuit diagram of the power recovery circuit and Fig. 4 of Kim shows a waveform view of a logic control pulse for illustrating the operation of the power recovery circuit. According to the disclosure of Kim at column 5, line 15 to column 6, line 65, a recovery control pulse erH and an applying control pulse erL are adjusted. However, the sustentation voltage control pulse susH, which controls an application of the sustentation voltage, is not adjusted.

As described above, according to the invention, malfunctions and erroneous discharges can be avoided in addition to power consumption being reduced. In the Kim plasma display apparatus, however, malfunctions and erroneous discharge cannot be avoided. In the invention, the power consumption is reduced because of the adjustment of the changing edges of driving signals of the first and second output devices. The magnitude of the reduction in power consumption when employing the invention is larger than the reduction in power consumption when employing the power recovery circuit of Kim. (See, for example, the present specification at page 13, lines 8-18 and FIG. 9.)

Thus, the features and benefits of the invention are not afforded by or attainable in the Kim apparatus and, it is submitted, that claim 1 patentably distinguishes over the cited art and is allowable.

It is submitted that claim 11 patentably distinguishes over the cited art for reasons similar to those of claim 1, as well as for the additional recitations therein.

It is submitted that claims 2, 5-6, 8 and 12 patentably distinguish over the cited art for at least the same reasons as those of claims 1 and 11, as well as for the additional recitations therein.

For example, claim 5 relates to an ALIS (alternate lightning of surfaces) type plasma display apparatus. The Examiner's assertion that Kim discloses the ALIS type plasma display apparatus in FIGS. 1 and 2 is incorrect. To realize the ALIS type plasma display apparatus in which display lines are formed at both sides of second (Y) electrodes, two X sustaining circuits and two Y sustaining circuits are necessary as shown in Fig. 4 of this application. However, Kim has no such description or figure.

Thus, it is submitted that claim 5 includes additional patentable distinctions beyond that of claim 1 from which claim 5 depends.

ITEMS 3 AND 4: REJECTION OF CLAIMS 9 AND 16 FOR OBVIOUSNESS UNDER 35 USC §103(a) OVER MARCOTTE IN VIEW OF BARCLAY ET AL.

The rejection is respectfully traversed.

CLAIMS 9 AND 16

According to claim 9, the circuit devices form the X and Y sustaining circuits which supply sustaining pulses. Further claim 9 recites that "the circuit devices are classified according to the delay times" and, moreover, that "sets of the classified circuit devices are selected so that a timing of a changing edge of each said sustaining pulse falls within a predetermined allowance." These operations are performed in the manufacturing process.

Marcotte discloses a display panel sustain circuit in which an energy recovery operation is precisely controlled. According to Marcotte, signal transitions are automatically adjusted to be optimum in an apparatus. (See, for example, Marcotte at column 9, lines 1-5.) Therefore, the concept of Marcotte is completely different from that of the invention recited in claim 9.

According to the invention recited in claim 9, the circuit devices which form X and Y sustaining circuits are classified according to delay times. However, Marcotte does not discuss

that the circuit devices are classified. Furthermore, according to the invention recited in claim 9, sets of the classified circuit devices are selected so that a timing of a changing edge of each sustaining pulse falls within a predetermined allowance. However, Marcotte does not discuss that sets of the classified circuit devices are selected.

More particularly, the Examiner asserts, in the Office Action at page 4, lines 11-20, that Marcotte "shows ... delay times of circuit devices with respect to signals, which are measured (note in figure 7 the current meters A1 and A2 for measuring the delay time of the circuit devices). Marcotte (figs. 6, 8) teaches about timing of a changing edge (sic) (col. 5, lines 41-col. 6, line 12; col. 6, lines 28-62) of each said sustaining pulse falls within a predetermined allowance (col. 8, lines 45-46; col. 8 line (sic) 62 -col.9, line 5)..."

Marcotte discloses "a pair of current meters A1 and A2" which measures the current through resistor R4 and switch S6, respectively, to control the closing of switches S3 and S4, respectively. In the Marcotte sustain circuit, the current meters A1 and A2 do not measure delay times of circuit devices but instead are used to control the switches S3 and S4 to change from state 1 to state 2 and to change from state 3 to state 4, respectively. (See Marcotte at column 5, line 35-65, column 6, lines 14-60, and FIG. 7.) Thus, the current meters A1 and A2 of the Marcotte sustain circuit control switches S3 and S4 to change the circuit configuration of the Marcotte sustain circuit, and, in particular, the current meters A1 and A2 of the Marcotte sustain circuit control do not measure anything with regard to delay times of circuit devices.

Barclay et al. discusses sustain voltage levels. However, Barclay et al. does not discuss anything related to measuring "delay times of circuit devices with respect to signals, which form the X sustaining circuit and the Y sustaining circuit" and, furthermore, does not discuss selecting "sets of the classified circuit devices ... so that a timing of a changing edge of each said sustaining pulse falls within a predetermined allowance" (as recited in claim 9). This is because Barclay et al. does not discuss anything related to delay times of circuit devices with respect to signals or to selecting sets of the circuit devices, since Barclay et al. is directed to operating margins of the sustain voltage levels.

Thus, it is submitted that claim 9 patentably distinguishes over the cited art and is allowable.

Further, it is submitted that claim 16, for reasons similar to those of claim 9, patentably distinguishes over the cited art and is allowable.

CONCLUSION

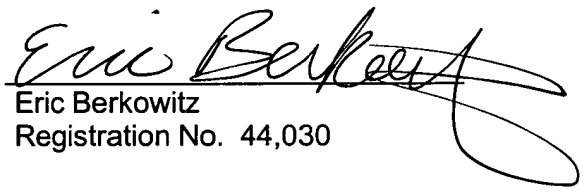
It is respectfully submitted that the pending claims patentably distinguish over the art of record and, there being no other objections or rejections, that the application is in condition for allowance, which action is respectfully solicited.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: April 15, 2003

By: 
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please AMEND claims 1 and 11 as follows, and the remaining pending claims are provided below for the convenience of the Examiner.

1. (TWICE AMENDED) A plasma display apparatus, comprising:

a plasma display panel equipped with first electrodes and second electrodes arranged adjacently to each other, extending in a first direction, and address electrodes extending in a second direction at a right angle to the first direction;

an X sustaining circuit that supplies sustaining pulses to said first electrodes;

a Y sustaining circuit that supplies sustaining pulses to said second electrodes[;],

wherein said X and Y sustaining circuits respectively comprise:

a first output device provided between a path connected to said first or second electrodes and a high potential power supply[;],

a second output device provided between the path connected to said first or second electrodes and a low potential power supply[;],

a first phase adjusting circuit that adjusts timing of a changing edge of a driving signal which drives said first output device[;], and

a second phase adjusting circuit that adjusts timing of a changing edge of a driving signal which drives said second output device.

2. (AS ONCE AMENDED) The plasma display apparatus, as set forth in claim 1, wherein the X sustaining circuit and the Y sustaining circuit include power recovery circuits each of which has a resonant circuit formed with a display capacitor of the plasma display panel, recovers energy when an application of the sustaining pulse is released and uses the recovered energy for a next application of the sustaining pulses, is provided.

3. (AS ONCE AMENDED) The plasma display apparatus, as set forth in claim 2, wherein the X sustaining circuit and the Y sustaining circuit comprise the first and the second output devices connected between a path through which the sustaining pulses are supplied and a high voltage power source line, and between the path and a low voltage power source line, respectively, a third output device that switches a connection state of the path and the power

recovery circuit to a state in which power is supplied from the power recovery circuit to the path, a fourth output device that switches the connection state of the path and the said power recovery circuit to a state in which power is recovered from the path to the power recovery circuit, and a first drive circuit through a fourth drive circuit that drive the first through the fourth output devices, respectively; and a phase adjusting circuit to adjust a time difference between a turning on of the third output device and that of the first output device, and a time difference between a turning on of the fourth output device and that of the second output device.

4. (AS ONCE AMENDED) The plasma display apparatus, as set forth in claim 3, wherein the phase adjusting circuit comprises the first phase adjusting circuit, the second phase adjusting circuit, a third phase adjusting circuit and a fourth phase adjusting circuit provided at a stage preceding the first drive circuit through the fourth drive circuit, respectively.

5. (AS ONCE AMENDED) The plasma display apparatus, as set forth in claim 1, wherein the plasma display panel forms a first display line between one side of one of the second electrodes and one adjacent electrode of the first electrodes, a second display line between another side of the one second electrode and another adjacent electrode of the first electrodes, and forms a display field of a frame by plural subfields, and provides a gray scale by combining said subfields selectively for display; the X sustaining circuit is equipped with a first X sustaining circuit that supplies the sustaining pulse to an odd-numbered electrode of the first electrodes, and a second X sustaining circuit that supplies the sustaining pulse to an even-numbered electrode of the first electrodes; and the Y sustaining circuit is equipped with a first Y sustaining circuit that supplies the sustaining pulse to an odd-numbered electrode of the second electrodes, and a second Y sustaining circuit that supplies the sustaining pulse to an even-numbered electrode of the second electrodes.

6. (AS ONCE AMENDED) The plasma display apparatus, as set forth in claim 5, wherein the first X sustaining circuit and the second X sustaining circuit and the first Y sustaining circuit and the second Y sustaining circuit are equipped with phase adjusting circuits, respectively; and a difference in rising or falling timing between the sustaining pulse output by the first X sustaining circuit and that output by the first or the second Y sustaining circuit, and a difference in rising or falling timing between the sustaining pulse output by the second X

sustaining circuit and that output by the first or the second Y sustaining circuit are adjusted so that the differences of the timings are within a predetermined range.

7. (AS ONCE AMENDED) The plasma display apparatus, as set forth in claim 6, wherein the predetermined range is within ±30 ns.

8. (AS ONCE AMENDED) The plasma display apparatus, as set forth in claim 1, wherein a phase adjusting circuit is set by observing a waveform when the sustaining pulse is applied to the first or second electrode of the plasma display panel.

9. (AS ONCE AMENDED) A manufacturing method of a plasma display apparatus comprising a plasma display panel having first electrodes and second electrodes arranged adjacently to each other, extending in a first direction, and address electrodes extending in a second direction at a right angle to the first direction, an X sustaining circuit that supplies a sustaining pulse to said first electrodes, and a Y sustaining circuit that supplies a sustaining pulse to said second electrodes, wherein delay times of circuit devices with respect to signals, which form the X sustaining circuit and the Y sustaining circuit, are measured and the circuit devices are classified according to the delay times; sets of the classified circuit devices are selected so that a timing of a changing edge of each said sustaining pulse falls within a predetermined allowance; and the sets of the selected circuit devices are provided for the plasma display apparatus.

10. (AS ONCE AMENDED) A manufacturing method of a plasma display apparatus, as set forth in claim 9, wherein said plasma display panel forms a first display line between one side of one of the second electrodes and one adjacent electrode of the first electrodes, a second display line between another side of the one second electrode and another adjacent electrode of the first electrodes, forms a display field of a frame by plural subfields, and provides a gray scale by combining said subfields selectively for display; the X sustaining circuit is equipped with a first X sustaining circuit that supplies the sustaining pulse to an odd-numbered electrode of the first electrodes, and a second X sustaining circuit that supplies the sustaining pulse to an even-numbered electrode of the first electrodes; the Y sustaining circuit is equipped with a first Y sustaining circuit that supplies the sustaining pulse to an odd-numbered electrode of the second electrodes, and a second Y sustaining circuit that supplies the sustaining pulse to an even-

numbered electrode of the second electrodes; and a difference in rising or falling timing between the sustaining pulse output by the first X sustaining circuit and that output by the first or the second Y sustaining circuit, and a difference in rising or falling timing between the sustaining pulse output by the second X sustaining circuit and that output by the first or the second Y sustaining circuit are adjusted so that the differences of timings are within a predetermined range, when the circuit devices of the first and second X sustaining circuits and the first and second Y sustaining circuits are selected.

11. (TWICE AMENDED) A plasma display apparatus having a plasma display panel with first electrodes and second electrodes arranged adjacently to each other, extending in a first direction, and address electrodes extending in a second direction at a right angle to the first direction, comprising:

X and Y sustaining circuits to supply sustaining pulses to said first electrodes and said second electrodes, respectively[;], wherein said X and Y sustaining circuits respectively comprise:

a first output device[;],

a second output device, the first and second output devices of respective X and Y sustain circuits generating sustaining pulses[;],

a first phase adjusting circuit to adjust timing of a changing edge of a first driving signal which drives said first output device[;], and

a second phase adjusting circuit to adjust timing of a changing edge of a second driving signal which drives said second output device.

12. (AS UNAMENDED) The plasma display apparatus, as set forth in claim 11, wherein the X sustaining circuit and the Y sustaining circuit, respectively, further comprising:

a power recovery circuit having a resonant circuit formed with a display capacitor of the plasma display panel to recover energy of an applied sustaining pulse for an application in a subsequent sustaining pulse.

13. (AS UNAMENDED) The plasma display apparatus, as set forth in claim 12, wherein the X sustaining circuit and the Y sustaining circuit, respectively, further comprise:

one of a first connection between a high voltage power source line and the first and the second output devices and a second connection between a low voltage power source line and the first and the second output devices to supply and recover energy from the sustaining pulses.

14. (AS UNAMENDED) The plasma display apparatus, as set forth in claim 13, wherein the X sustaining circuit and the Y sustaining circuit, respectively, further comprise:

a first drive circuit through a fourth drive circuit that drive the first output device through the fourth output device, respectively; and a phase adjusting circuit to adjust a time difference between a beginning of an on-state of the third output device and a beginning of an on-state of the first output device, and a time difference between a beginning of an on-state of the fourth output device and a beginning of an on-state of the second output device.

15. (AS UNAMENDED) The plasma display apparatus, as set forth in claim 14, wherein the phase adjusting circuit comprises the first phase adjusting circuit, the second phase adjusting circuit, a third phase adjusting circuit and a fourth phase adjusting circuit provided at a stage preceding the first drive circuit through the fourth drive circuit, respectively.

16. (AS UNAMENDED) A method of manufacturing a plasma display apparatus having X and Y sustaining circuits to supply sustaining pulses to first electrodes and second electrodes, respectively, comprising:

measuring delay times of circuit devices which form the X sustaining circuit and Y sustaining circuit with respect to signals;

selecting sets of the circuit devices so that a timing of a changing edge of each said sustaining pulse falls within a predetermined allowance; and

providing the selected sets of the circuit devices to the plasma display apparatus.